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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,021	02/01/2005	Mitsunori Toyoda	122349	9499

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EXAMINER

MATHEWS, ALAN A

ART UNIT	PAPER NUMBER
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2851

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,021	TOYODA, MITSUNORI	
	Examiner	Art Unit	
	Alan A. Mathews	2851	

The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-32, 46-51 and 54-57 is/are allowed.
- 6) ☒ Claim(s) 33-35, 37, 38, 40-42, 44, 45, 52, 53, 58 and 59 is/are rejected.
- 7) ☒ Claim(s) 36, 39 and 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/14/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 45 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 45, lines 7-12, define the terms of the equation. But claim 45 does not recite the equation, itself. It appears that claim 45 inadvertently left the out equation. At the very least, it is confusing why all the terms of the equation are being defined, but the equation, itself, is not recited.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 33, 37, 38, 40, 41, 58, and 59 are rejected under 35 U.S.C. 102(a) as being anticipated by Matsushita et al. (U. S. Patent Application Publication No. 2002/0126390 A1). Matsushita et al. discloses in figure 4 and paragraph # 0080, a first optical member at the element with the designation n_1 and a second optical member at the element with the designation n_3 . The optical members at n_1 and at n_3 are separated by a space (which has n_2). The term “space” has a

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broad meaning. Paragraph # 0080 discloses, on the last line, an embodiment where $n_1 < n_2 < n_3$. Or written in another way, $n_3 > n_2 > n_1$. Thus, the refraction index of an optical material forming the second optical member (at n_3) is set larger than a refraction index of an optical material forming the first optical member (at n_1). The preamble in claim 33 has not been given any patentable weight, since the body of the claim does not refer back to the preamble. With respect to claim 59, it is noted that this is a product-by-process claim. MPEP 2113 states **that the determination of patentability of a product-by-process claim is based on the product itself. The patentability of a product does not depend on its method of production.** The product Matsushita et al. appears to be the same product as produced by claim 59. It is noted that MPEP 2113 gives an example where the process of making the product was allowed, but the product-by-process was rejected.

With respect to Applicant's arguments concerning claims 33, 37, 40, and 41, the term "integrator" appears in the preamble, and therefore has not been given any patentable weight. The body of the claim does not refer back to the preamble. In addition, the optical members at n_3 and n_1 in figure 4 are spaced apart (by the member at n_2).

3. Claims 33, 37, 38, 40, 41, 58, and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese Patent document 2000-098102. The Japanese Patent document 2000-098102 discloses in figure 4 a first optical member 13 having a plurality of first minute refraction surfaces and a second optical member 14 having a plurality of second minute refraction surfaces. The optical member 13 is **spaced** from the optical member 14 by element

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15. The term “space” has a broad meaning. Paragraphs # 0028, # 0047 and # 0058 of the translation disclose that the refractive indexes of the optical element are $n_1 < n_2 < n_3$. Thus, either optical member 13 has a higher refractive index than optical member 14, or optical member 14 has a higher refractive index than optical member 13. The preamble in claim 33 has not been given any patentable weight, since the body of the claim does not refer back to the preamble. With respect to claim 40, figure 8 discloses an illumination optical device. With respect to claim 59, it is noted that this is a product-by-process claim.

With respect to Applicant’s arguments concerning claim 33, the term “integrator” appears in the preamble, and therefore has not been given any patentable weight. The body of the claim does not refer back to the preamble. In addition, the optical members at 13 and 14 in figure 4 are spaced apart (by the member 15). Applicant further argues that figure 7 discloses optical elements 13 and 14 before they are bonded together. But when elements 13 and 14 are bonded together, with element 15 therebetween, elements 13 and 14 in figure 7 would be spaced from each other by element 15.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. as applied to claim 33 above, and further in view of the Japanese patent document 07-098402. Matsushita et al. discloses the invention except for specifically reciting the difference in the index of refraction $0.05 \leq n_b - n_a$. The Japanese patent document 07-098402 discloses in paragraph # 0100 of the English translation a refractive index difference of about 0.05. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the index of refraction differences $0.05 \leq n_b - n_a$ in Matsushita et al. in view of the Japanese patent document 07-098402 for the purpose of making a smaller difference and thus making better optical image.

6. Claims 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese Patent document 2000-098102 as applied to claim 40 above, and further in view of either Tanitsu et al. (U. S. Patent No. 6,741,394) or the German patent document DE 100 62 579 A1 (cited in Applicant's IDS). The Japanese Patent document 2000-098102 discloses in figure 8 optical elements 33 and 34 of different refractive indexes and a projection system. Liquid crystal component 32 is effectively a mask with a pattern. Thus, the Japanese Patent document 2000-098102 discloses the invention except for element 51 being a photosensitive substrate. Tanitsu et al. discloses in figure 8 and column 16, lines 53-67, and column 17 and column 18, lines 1-20, a projection system projection on a photosensitive substrate P. The German patent document DE 100 62 579 A1 discloses in figure 8 a projection system projecting on a photosensitive substrate

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P. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the projection screen 51 in the Japanese Patent document 2000-098102 a photosensitive substrate in view of Tanitsu et al. or the German patent document DE 100 62 579 A1 for the purpose of making the device in the Japanese Patent document 2000-098102 more versatile.

7. Claims 52, 53, 58, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanitsu et al. (U. S. Patent No. 6,741,394) in view of either Matsushita et al. (U. S. Patent Application Publication No. 2002/0126390 A1) or the Japanese Patent document 2000-098102. Tanitsu et al. discloses in figure 8 and column 17, lines 12-42, introducing a radiation from a source 20 to a plurality of first minute refraction surfaces 23a which are integrally formed on a first optical member of an optical integrator. The radiation from the first minute refraction surfaces is then introduced to a plurality of second minute refraction surfaces 23b. The radiation from the optical integrator then illuminates a pattern on mask M. The pattern image is then projected onto substrate P. Figure 8 discloses that the first and second optical elements 23a and 23b are separated by a space (see figure 9 for another example of spaced first and second optical elements 33a and 33b and figure 11 for another example of first and second spaced optical elements 151 and 152). Thus Tanitsu et al. discloses the invention except for having a refraction index of the second optical member set larger than a refraction index of an optical material forming the first optical member. Matsushita et al. discloses in figure 4 and paragraph # 0080, a first optical member at the element with the designation n_1 and a second optical member at the element with the designation n_3 . The optical members at n_1 and at n_3 are separated by a space

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(which has n_2). Paragraph # 0080 discloses, on the last line, an embodiment where $n_1 < n_2 < n_3$.

Or written in another way, $n_3 > n_2 > n_1$. Thus, the refraction index of an optical material forming the second optical member (at n_3) is set larger than a refraction index of an optical material forming the first optical member (at n_1). The Japanese Patent document 2000-098102 discloses in figure 4 a first optical member 13 having a plurality of first minute refraction surfaces and a second optical member 14 having a plurality of second minute refraction surfaces.

The optical member 13 is **spaced** from the optical member 14 by element 15. Paragraphs # 0028, # 0047 and # 0058 of the translation discloses that the refractive indexes of the optical element are $n_1 < n_2 < n_3$. Thus, either optical member 13 has a higher refractive index than optical member 14, or optical member 14 has a higher refractive index than optical member 13.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the refraction index of an optical material forming the second optical member at 23b larger than a refraction index of an optical material forming the first optical member in view of either Matsushita et al. or the Japanese Patent document 2000-098102 for the purpose of forming a better exposure and thus producing a better final product. With respect to claim 59, it is noted that this is a product-by-process claim. MPEP 2113 states **that the determination of patentability of a product-by-process claim is based on the product itself. The patentability of a product does not depend on its method of production.** The product in the modified device of Tanitsu et al. and Matsushita et al. or Tanitsu et al. and the Japanese Patent document 2000-098102. appears to be the same product as produced by claim 59.

Allowable Subject Matter

8. Claims 19-32, 46-51, and 54-57 are allowed. Claims 36, 39, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma-1)^3 \cdot NA^2/\Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a/ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces, and ϕ_b , a refracting power of the second minute refraction surfaces, is γ , numerical aperture on the emission side of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn , in combination with all the other elements recited in independent claims 19.

The prior art does not disclose or suggest an optical integrator used for light having a wavelength of 300nm or less, wherein the optical material forming the first optical member includes fluorite, and wherein the optical material forming the second optical

member includes silica glass in combination with all the other elements recited in the parent claim to dependent claim 36.

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma-1)^3 \cdot NA^2/\Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a/ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces, and ϕ_b , a refracting power of the second minute refraction surfaces, is γ , numerical aperture on the emission side of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn , wherein an absolute value of the parameter β in terms of a direction optically approximately perpendicular to the scanning direction is set lower than an absolute value of the parameter β in terms of the scanning direction in combination with all the other elements recited in the parent claims to dependent claims 39 and 43.

The prior art does not disclose or suggest wherein a parameter β satisfies the following conditions:

$$\beta < 0.2 \text{ (where } \beta = (\gamma-1)^3 \cdot NA^2/\Delta n^2 \text{)}$$

where a refracting power ratio ϕ_a/ϕ_b between ϕ_a , a refracting power of the first minute refraction surfaces in terms of a non-scanning direction optically approximately

perpendicular to the scanning direction and ϕ_b , a refracting power of the second minute refraction surfaces in terms of the non-scanning direction is γ , numerical aperture on the emission side in terms of the non-scanning direction of the optical integrator is NA, and a difference between a refraction index of a medium on a light entrance side of the second minute refraction surfaces and a refraction index of a medium on a light emission side of the second minute refraction surfaces is Δn ., in combination with all the other elements (claim 46) or steps (claims 47, 50, and 54) recited in each of independent claims 46, 47, 50, and 54.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

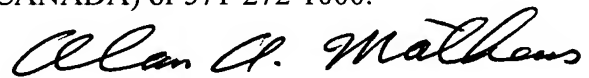
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Alan A. Mathews
Primary Examiner
Art Unit 2851

AM